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# GARDEN AND FOREST

A JOURNAL OF HORTICULTURE LANDSCAPE ART AND FORESTRY

SEPTEMBER 30 1891

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Among the contents of next week's issue (No. 189) will be the following articles:

**A Study of Our Native Timbers.**
EDITORIAL.

**Aster Shortii.** (With figure.)

**The Forest-vegetation of the Upper Mississippi.—II.**
By PROFESSOR L. H. PAMMEL.

**Orchid Notes.**
By W. WATSON.

The paper will contain a figure of Aster Shortii, from a drawing by Mr C. E. Faxon.

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TABLE OF CONTENTS.


PAGE.

EDITORIAL ARTICLES:—Jeffrey's Pine. (With figure.) . . . . . 457
English Walnuts . . . . . *P. L. Simmonds.* 458
The Gardens of Le Nôtre . . . . . 458
The Weeds of California.—V . . . . . *Professor E. W. Hilgard.* 458
How We Renewed an Old Place.—XIX . . . . . *Mrs. J. H. Robbins.* 459
Forest-vegetation of the Upper Mississippi.—I. . *Professor L. H. Pammel.* 460

RECENT PLANT PORTRAITS . . . . . 462

CULTURAL DEPARTMENT:—Plums and Plum-trees . . . . . *E. P. Powell.* 462
The Planting of Hardy Bulbs . . . . . *E. O. Orpet.* 463
The Newer Phloxes . . . . . *E. P. Powell.* 464
Protecting Plants in Mild Climates . . . . . *Professor W. F. Massey.* 464
Centranthus ruber, Nicotiana affinis . . . . . *G.* 464
Cereus triangularis . . . . . *R. Cameron.* 464
Symplocos cratægoides . . . . . *S.* 465

CORRESPONDENCE:—The Beaver and the Flow of Streams . . . . . *H. B. A.* 465

POMOLOGY:—Meeting of the American Pomological Society.—I.: The President's Address . . . . . 465
The Hybridization of Plants . . . . . *Professor Charles E. Bessey.* 466
Success with Small Fruits . . . . . *J. H. Hale.* 467
New and Promising Small Fruits . . . . . *J. T. Lovett.* 467

NOTES . . . . . 468

ILLUSTRATION:—Jeffrey's Pine (*Pinus Jeffreyi*) on the Mountain above the Yosemite Valley, Fig. 73. . . . . 461


## Jeffrey's Pine.

ONE of the interesting journeys that can be made through the forests of North America is from some point in Nevada, like Reno or Carson's City, at the eastern base of the Sierra Nevada, across the mountains into California. The Yosemite Valley can be reached in this way from Nevada by an easy drive of four or five days, during which the traveler will be able to examine the flora of the two sides of the range, and to study, as well as in any other part of the world, the influence of moisture upon the growth of forests. The scenery which will unfold before his eyes as he mounts the eastern slopes will well repay the fatigue and trouble of such a journey; and a more comprehensive and satisfactory idea of the Sierra Nevada and its forests will be obtained than can be acquired in the conventional, and now somewhat hackneyed, journey into the Yosemite from the California lowlands.

The hot, dry barren foot-hills which stretch along the eastern base of the mountains do not offer much that is beautiful or attractive, but when these have been crossed and the real ascent of the mountains begins, a wonderful forest of Pine-trees will be entered. The lowest limit of this forest is rather below 6,000 feet above the sea-level, and it is necessary to climb 3,000 or 4,000 feet higher to see its upper limits. To the person coming from the east for the first time this forest will appear marvelous. Its floor is bare of vegetation, except where here and there a Ceanothus has gained a foothold and spread into a low broad mass of spiny branches, or where taller shrubs occupy the abrupt sides and the bottoms of narrow cañons. The trees stand sometimes close together, and sometimes at considerable distances apart; they are often 250 or 300 feet tall, their great trunks ten or twelve feet in diameter and free of branches, except near the top of the trees. These trunks are splendid; there are not many things more impressive or more beautiful. The bark is immensely thick, and is broken by deep fissures into great cinnamon-red armor-like plates, across which the sunlight, as it flickers down through the scanty canopy above, casts long shadows. The branches are few and small in proportion to the trunks, and bear at their ends great brush-like clusters of pale blue-green foliage and immense quantities of large chestnut-brown cones, which, in early autumn, sometimes completely cover the ground under the trees.

This tree is Jeffrey's Pine, the *Pinus Jeffreyi* of botanists. It is a so-called Yellow or Pitch Pine, and, botanically, is very closely related to the California Yellow Pine (*Pinus ponderosa*). It belongs to a small group of western America Pines, to which the name of "Broken-cone Pines" has been applied, from the fact that when the cones ripen and fall their bases, with a few scales attached, remain on the branches. Jeffrey's Pine, probably, never grows to such an enormous size as the California Yellow Pine, but it is a handsomer tree, one of the noblest of all Pines as it is seen in its native forests, and one of the largest, for only two of the genus grow larger, the Sugar Pine and the Yellow Pine.

Jeffrey's Pine may be recognized by its stout, pale blue-green leaves, which are seven or eight inches long, and produced sometimes in twos and sometimes in threes on the same branch; by the pale glaucous shoots, which sometimes become orange-colored during their first winter, and which, when broken, exhale a pleasant aromatic perfume like that possessed by some plants of the Rue family. The cones, too, distinguish it from its nearest ally, the California Yellow Pine; they are elliptical, purple at first, and only become brown as they approach maturity, when they are from six to ten inches in length, and four or five inches in breadth after the stout scales, armed with slender, strongly recurved prickles, have opened. The seeds are an inch long, with long, rather narrow wings, and usually contain more cotyledons than the allied species.

Jeffrey's Pine, like most trees of wide distribution, varies considerably in habit and in general appearance in different parts of the country. The form, which may be considered a type of the species, as it was the first one known to science, is a comparatively low tree, with a trunk four or six feet in diameter covered with dark bark, and with rather pendulous branches. This is a common tree on the high mountains west of Mount Shasta in northern California, and occurs on the southern and south-eastern flanks of several of the high Sierra peaks in the northern and central parts of the state. On the eastern slopes of the Sierras, where Jeffrey's Pine is found, from northern California to the San Jacinto Mountains, Jeffrey's Pine becomes a larger tree, with red bark and larger cones. For this form Mr. Lemmon, who gives an excellent account of the California Pines in his two reports upon the Pacific coast conifers, proposes the name of Red Bark Pine; in a Pine of lower California he recognizes another form of our species, which he designates as var. peninsularis. "It forms," he tells us, "east of Todos Santos Bay, at an elevation of about 4,000 feet, an extensive forest upon loose débris of white granite, seemingly to cover the region where this rock prevails."

Economically and commercially, Jeffrey's Pine is a tree of the first importance. The wood which it produces, when it has been developed under favorable conditions, is strong and light, although rather hard and coarse-grained. It has been manufactured in immense quantities on the eastern slope of the Sierras, especially in the neighborhood of Donner's Lake and other points convenient to the line of the Central Pacific Railroad. It is this tree which has supplied the timber for the mines at Virginia City and Eureka, and at hundreds of less-important mining-camps. Three-quarters of the buildings which have been erected during the last twenty-five years in Nevada and western Utah are built of the wood of this tree. The demand has swept the mountains bare in many places, and it is still increasing. The climate in which Jeffrey's Pine has grown to its greatest size is one of excessive summer dryness. Trees in such a climate grow very slowly, and

sometimes require centuries in which to reach their full size. Few young trees are springing up on the Sierras to replace the giants as they fall under the axe of the Nevada lumberman. Fires are increasing in number and destructiveness in all this region, and it appears a foregone conclusion that as a national source of lumber-supply the forest of Jeffrey's Pine on the eastern side of the Sierras will have ceased to exist before another quarter of a century has passed.

The discovery of *Pinus Jeffreyi* was one of the results of the so-called "Oregon expedition," an association of Scotchmen who sent John Jeffrey, a Scotch gardener, to the Pacific coast in 1852 to collect seeds and plants. He found the Pine which now bears his name on Scott's Mountain, a rugged range west of Mount Shasta, and in the same region the rare *Pinus Balfouriana*, and, in different parts of California, a number of other plants, including *Pinus Murrayana* and *Pinus albicaulis*. These Pines and some other trees were described and figured by Mr. Andrew Murray, Secretary of the Oregon Association, and by Professor Balfour in a pamphlet of three pages, without a title or a title-page, but accompanied by five plates. It was printed privately and distributed among the subscribers, and is one of the rarest works which have been published on North American trees. A single copy is now known to exist in the United States.

The illustration on page 461 represents a grove of Jeffrey's Pine growing on an elevated spur of the Sierras, above the Yosemite valley. The trees are characteristic of the species as it is found at high elevations and in excessively exposed situations. They are small and stunted in comparison with the great trees which grow at lower elevations on the eastern side of the mountains, where, as we have already said, this species is seen at its best. The illustration is from a photograph made by Dr. William H. Rollins, of Boston.

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Mr. P. L. Simmonds contributes to a recent issue of the *Gardeners' Chronicle* some interesting information about the so-called English walnuts, from which the following facts are gathered:

There are many varieties of these nuts, such as the oval, round, double, large and small-fruited, early and late, tender thin-shelled and hard thick-shelled. An almost huskless variety occurs in the north of China. The larger portion of the walnuts consumed in England are of foreign growth, and average in quantity about 250,000 bushels. The bulk of these come from France and Belgium, and small quantities from Germany, Holland and Italy.

Bordeaux is one of the largest exporting ports in the world, perhaps the largest for walnuts; and small quantities are now sent from Chili to Europe. The culture of the so-called English Walnut, which, by the way, is not an English tree at all, but a native of the Orient and of central and eastern Asia, from whence it was early introduced into Europe, is now diffused all over Italy, from the Alps to the valleys of Sicily. It is thought, however, that the number of cultivated Walnut-trees in Italy is diminishing as the demand for the timber is increasing, being in great demand by the cabinet-maker.

Persons with weak digestions will do well to bear in mind Mr. Simmonds' warning, that walnuts, as long as the skin can be easily removed from them, are a nutritious and healthy article of diet; but when they become dry, so that they cannot be easily peeled, they are indigestible.

Walnuts in the shell yield about one-third their weight of picked kernels, which are the crumpled cotyledons or seed-leaves. In some northern districts, particularly in Piedmont, Walnut-trees have always been held in high estimation for the production of oil, which, when newly made, has a very agreeable taste, and can be employed in cookery as well as in the preparation of varnish.

The Walnut grows abundantly in Kashmir, Nepal and other parts of India, where the fruits are largely used. It forms also an important article of consumption in Japan, quantities being eaten in a raw state. They are also much used for making a kind of confection, by cracking and removing the shell without hurting the kernel, which is afterward coated with white sugar, thus making an attractive and agreeable sweetmeat.

The Walnut also furnishes in Japan a bland oil, used for domestic purposes. In China it seems to be pressed for oil, as in some years over 12,000 tons are exported from the port of Tientsin in the year. The Walnut is extensively cultivated in the Punjab, among the Himalayas and in Afghanistan, a large annual supply being brought to the plains of India by the Kabuli and other traders from the hills. There are several well-known forms of this nut met with, the soft-shelled kind of Kashmir and Chamba being considered the best.

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## The Gardens of Le Nôtre.

THE determining power of fitness, appropriateness, in all periods when art has really been great, the fact that its greatness sprang from its truthful expression of material needs and social conditions, is well shown by the following passage, which we quote from Planat's "Encyclopédie de l'Architecture et de la Construction." What, asks the author, were the architectural requirements of society in the time of Louis Quatorze? "Spacious, richly decorated apartments, in which the court could stand in state while awaiting the passage of the king; in which painting and sculpture should play a secondary, decorative rôle, not the principal rôle as in Italian palaces. In an Italian gallery art was the chief occupant; here it was society; there, architecture supplied a setting for pictures and statues; here, pictures and statues adorned the architecture. French society demanded festal halls and gardens which might serve as open-air drawing-rooms, prolonging the architecture of the noble and stately palaces; gardens embellished with white allegorical statues and colonnades, with trimmed hedges enclosing rooms of living green; gardens furnished here and there with marble stairways, whereon the court could range itself in successive rows; gardens with canals and lakes dotted over with pleasure-galleys bedecked with flags, and with carefully managed perspectives opening in all directions. Under Louis Seize it became the fashion to ridicule these geometrical parterres, these trimmed Yews, these waters trained to spout in complicated patterns and figures, this entire absence of all real nature." But, the author explains, it was much more ridiculous for courtiers to disport themselves in the "dairies" of the Trianon, aping in satin and powder the tasks and amusements of peasants. The main fact is, that the destination of such gardens as those of Versailles "precluded all pretension to rusticity; that their architecture could serve only as a setting or background for the toilets of ladies in grand state and the costumes of men dressed in velvets and brocades; surely damp grass, wet ground, bushes and underbrush were out of the question in the circumstances. . . . In the city likewise, from the street which was still usually narrow and dirty and was nothing more than a way of communication, a lofty porte-cochère gave entrance to a vast court, where a great number of carriages could freely circulate; a noble flight of steps hospitably offered access to a well-lighted vestibule. Galleries with high windows opened, even in Paris, on broad regularly laid-out gardens, which imparted a seigneurial air to the edifice. Studying the old city maps one is struck by the number and extent of these gardens, and their existence explains the fact that so little attention was paid to the plan of the streets themselves."

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## The Weeds of California—V.

THE entire tribe of Ragweeds (Ambrosia) is absent from the California list of weeds. The native Franseria is innocent.

*Sonchus oleraceus* (the Milk Thistle of Californians) and *Senecio vulgaris* thrive as well in California as anywhere in the world, and are found throughout the settled portions of the state. The Senecio will germinate in the middle of the summer's drought almost as well as the Centaureas.

*Erigeron Canadense* affects chiefly the irrigated lands, and there demonstrates an unexpected resistance to even very strong alkali, such as few useful plants could resist. In Fresno and Tulare counties it reaches easily the height of eight feet, and forms thickets not pleasant to penetrate. In unirrigated lands it rarely becomes troublesome, and is of small stature, but, nevertheless, maintains itself fully where once established.

*Cichorium Intybus* obstinately retains possession of fields where it has been cultivated, and spreads more or less, but outside of such cases can hardly be considered troublesome.

The *Matricaria discoidea* is extensively diffused in the state, and lines the roadsides all over the Bay country, emitting its pleasant fragrance in the hot sun. *Chrysanthemum Leucanthemum* has gained a foothold in a few localities in the same region, but is not troublesome, and does not seem to spread rapidly. *C. segetum* is found at a few points on the Bay borders.

Of native composites, the Tarweeds are the most objectionable; not so much because of their persistence as weeds as on account of the inconvenience caused by their viscid secretion, both to the person and clothes of the farmer and to certain products. *Madia sativa* is the most generally obnoxious, both because of its almost universal occurrence in fields and roadsides, its extremely abundant secretion and its disreputable aspect when covered with dust. An expensive bath of alcohol alone seems capable of removing the resinous slime from the injured clothes.

Several Hemizonias are hardly behind the Madia in these respects, and several add to it a strong, and sometimes disagreeable, odor; among these the *H. elegans* stands foremost, but this species is not often found in cultivated fields. The *H. luzulæfolia*, on the other hand, exhales a spicy odor of myrrh, which is wafted over the harvest-fields in July and August, and, in a measure, condones the disagreeable qualities of the plant, which really hurts the grain but little, attaining its growth after the crop is off the ground, and then seeding the latter most thoroughly when plowing cannot be done on account of the dryness of the soil. Several other species, however (*H. virgata, paniculata, Kelloggii*), are not so innocuous, as they grow up very rapidly among the grain while in milk, rendering it impossible to harvest without commingling it with the grain, and then often spoiling both straw and grain with its resinous exsudation. They often form impassable thickets along the irrigation ditches in the San Joaquin Valley.

The Wild Sunflower (*Helianthus annuus*, or *lenticularis*), occurring naturally on rich and moderately moist soils, finds greatly increased opportunities for development when the land is cultivated, and sometimes covers the ground first broken completely in defiance of crops sown. It is not, however, very persistent, and repeated mowing soon diminishes it down to an easily manageable condition. But its complete extirpation is quite difficult. *Helianthus Californicus*, occurring only in low, wet lands, is not very troublesome.

The place held in Europe and the east by the Dandelion is measurably filled in California by several large-flowered species of Troximon (popularly called Dandelions) and Hypochæris, whose feathered akenes fill the air in summer. They hardly invade the cultivated ground, but chiefly pastures and lawns. The true Dandelion (Taraxacum) was at one time introduced as a matter of sentiment by an admirer, but showed such wonderful powers of development that it was with some expense extirpated from the threatened lawns.

Of other composites that invade the fields more generally but without doing any material injury, the beautiful Layias deserve mention. They make the ground gay beneath the half-ripe grain and afterward develop more fully. The *Achyrachæna mollis*, very inconspicuous while in bloom, sometimes forms a dense mat beneath the grain, and after harvest covers the field and fills the air with its beautiful silvery winged akenes.

*Matricaria occidentalis* invades the grain-fields of the Bay region to some extent, but is not seriously troublesome.

The *Primulaceæ* furnish only the ubiquitous *Anagallis arvensis*, but this attains a degree of development which, from its prevalence in the moist European climates, would hardly be expected. From early spring until the beginning of winter the multitudinous seeds of this little plant germinate, from the surface of moist soil or from the depths of that which is parched and hot, and with a tenacity of life worthy of a better cause. With the two Centaureas, the Stellaria and the *Erodium Cicutarium*, it constiutes a group of weeds that make an exception to the prevalent rule that after the cessation of rains the California farmer may consider the weed-fight over for the season. In the northern part of the state its flowers have the usual dull red tint; in the southern, their color is frequently purple or almost blue.

Of the *Apocynaceæ*, *Apocynum cannabinum* invades pastures from the woodlands in the northern part of the state, but does not become troublesome south of Oregon and Washington.

*Asclepias fascicularis* maintains a place in cultivated fields of the black adobe character with some tenacity; *A. Fremonti* and *A. eriocarpa*, and locally *Gomphocarpus tomentosus*, maintain themselves in pastures to the occasional detriment of sheep and cattle who are tempted to vary their dry summer diet with something green, and are poisoned by eating the leaves.

Of the *Gentianeæ*, *Erythræa Muhlenbergii* keeps a place even in cultivated fields to some extent, and very commonly in pastures.

Of the numerous Gilias only *G. squarrosa* rises to the dignity of a weed, both in pastures and cultivated fields, where its spinous leaves and bracts, and, above all, the intense odor that has given it the name of Skunk-weed, render it obnoxious. Its viscous tomentum covered with dust give it a forlorn aspect, and one sees with surprise the small blue, star-like flowers amid this mass of dirt, spines and fetor.

*Acelia tanacetifolia* is the only weed here from the large family of *Hydrophyllaceæ;* its prickly hirsute stem and foliage render it an uncomfortable invader of the fields, and there is no compensation in its dull, yellowish white flower-coils. It does not withstand persistent cultivation.

Among the *Borragineæ*, two native Amsinckias, *A. intermedia* and *A. lycopsoides*, are truly troublesome weeds in the Coast ranges, maintaining themselves on the heavier clay soils which they naturally occupy, despite of cultivation and to the material injury of grain crops, with which in many seasons they share the ground evenly or prevalently. From the clinging quality of their hooked, hirsute tomentum the Amsinckias have received the inappropriate name of Yellow tarweed, although entirely innocent of resinous qualities. The nutlets accompany the bristly calyx on its migrations in the hair of cattle.

University of California. *E. W. Hilgard.*

## How We Renewed an Old Place.

### XIX.—A WATER GARDEN.

IF one is unable to secure ample assistance, and is obliged to develop a place slowly, the order of planting should be trees first, shrubs second, flowers last of all.

Trees may be considered as the skeleton, the frame-work upon which the whole scheme is constructed, giving it strong substantial outlines and decisive meaning. Shrubbery plays the part of muscles and flesh, covering the unsightly bare places, rounding out the form, supplying the essential, and giving grace and symmetry to the enclosure; while flowers may be regarded as the clothing with which the completed body is finally adorned. Naturally, one cannot resist sticking in a few flowers as he goes along, but their disposition is not final, and they take up a deal of time, and are, consequently, to be relegated to a subordinate place at first, and looked forward to as the occupation reserved for those future unemployed hours when the woody plants can be left to grow and fulfill their mission.

Here, where the watering during summer, and frequent digging about and top-dressing, to retain moisture, are absolutely essential to trees and shrubs, flowers that have to be weeded and tended are much neglected, and only those hardy perennials that will take care of themselves and defy weeds, have as yet any kind of a show. But we are always dreaming of a period when the ligneous plants can be let alone and we can turn our attention seriously to the purely ornamental.

In the mean time, such wild things as come up of their own accord, on the hill and in the meadow, are full of interest, particularly in early spring and in late August, when the stock of hardy garden-flowers runs comparatively low.

At the latter period the little spot that I call my water garden is really quite a sight for such a humble affair, a mere mud-hole as it were, formed by a spring at the foot of the hill, which makes a tiny frog-pond, about ten feet or less in diameter. The frogs themselves are quite ornamental, wearing, as they do, the most gorgeous yellow and green coats, and being quite sociable and friendly, ready to sit on a chip and croak when we pay them a visit, and making music for us in the spring before the birds are fairly abroad. The old bull-frog, with a hoarse cold, is not always a comfort, for he has a way of coughing at night, like an asthmatic old gentleman, that is sometimes distressing, if you lie awake to listen, for it makes you sure his family must be anxious about him, but the piping little ones have quite a cheerful note, which blends agreeably with the chirpings of the grasshoppers.

On the marshy banks of the little pool, which cannot comfortably be reached without overshoes, some slim Willows are bravely growing, which I fear will some day make it too shady for the flowers, but at present they serve to give the spot a cosy and protected air, and the sunlight shifts through the light-foliage, and falls kindly on the bright group of blossoms that make it so gay at the end of summer.

The pool is close to an old gray fence, over which the wild vines clamber, and against which the Milkwort, with its stiff stems and smooth leaves, stands up erect, its panicled pink blossom a-top; not a very choice plant, but a sturdy one, and the vivid color "carries" well against the green, and composes agreeably with the masses of Arrowheads that are at this season full of blossoms and tall-stemmed sharp leaves, like a group of Amazons with their shafts drawn to the ear.

At the edge of the pool a mass of sedges has been left unmown, and here are clumps of the creamy blossoms of the wild Foxglove, mixed with all sorts of Golden-rod and some budding Asters, while the flowers of the Grasses are themselves beautiful and various in their own quiet way, some with plumes and some with spears, as if ready to oppose the Arrowheads.

The wild Carraway and the Yarrow show white among the grass, and there is a wonderful rosy hue in the tall spikes of Dock that are blooming near by. The Forget-me-nots are still full of blue blossoms, and spread out into the water far and wide, the earliest to come and the last to go of all the simple ornaments of the water garden.

But the glory of the pool is the Cardinal Flower, of rich dark red, which lifts its bracted racemes proudly and with the dignity of a true hierarch. This shows to advantage for the first time this year, having before fallen a victim to the careless scythe, so that its blossoms, which it persisted in putting forth in spite of discouragements, were only a few inches high. But this summer no mower was allowed to come within six feet of the spot, and we are well rewarded by the glow and stateliness of this superb flower, which would be an ornament to the proudest parterre. The Water-lily bulbs that we got from a nursery in the spring have proved a failure, whether because they were planted too deep in the mud or because the bulbs were defective, it is impossible to say. It may be that the spring is too cold for them, and that they require the warmer water of a pond; but they should not be difficult to raise, for I saw a pink Water-lily blossoming this summer in a rocky pool, with nothing to grow in but the ball of rich mud in which it had been tightly packed before being gently laid in its stony bed.

A picturesque spot it was, with a stream trickling down the face of a high granite rock, that formed the background to a tiny terrace-garden, in proportion to which the miniature brook was a river, along the grassy shores of which minute water plants were growing. A flight of stone steps led down into this terrace, which was banked around with flowers, leaving in the centre a turfed semicircle large enough for an afternoon tea-table and a few seats. Tall Pines waved overhead, and the tops of Oaks and Hornbeams intervened between the garden and the sea, which gleamed whitely between their rustling leaves. On the stone curb of the spring stood a quaint blue water-jug, and a drinking-cup made of a shell and a bit of bamboo. In a corner more rough stone steps led to a lower terrace, also girt about with flowers, from which a rocky winding path led down through the forest to the beach. Ivy clambered over the rocks, and wild flowers and grasses, intermixed with Ferns, hung from the crevices. It was a bit of artistic naturalness that would have enchanted a Japanese, and was the result of a fair woman's skillful planning and fine sense of the picturesque.

But, returning to our own water garden, we find higher up the bank the Hawkweed showing its yellow stars waving on slender stems, and the Prunella displaying its stiff blue clusters, while more Asters blossom, and tufts of Golden-rod cling to the hill-side, and entice us to a climb among the Pines.

Here we find that the dry summer has made havoc. Of the thirty-five planted in April we shall barely save a dozen. This is discouraging, but we have gone bravely to work to set some more, and try whether August skies will be more propitious in the way of rain. We have also put in a few Savins, though we hear they take unkindly to transplantation.

The little Oaks and Maples have thriven, and are showing green against the already withering grass. The soil is yearly improving by letting it lie fallow, and the foot sinks into the soft cushion the uncut hay is making as a covering for the sand and gravel. If it were not for endangering the seedlings, quite a crop could be harvested. It is not soil the hill lacks so much as rain; but the long drought parches and distresses the plantation, and will do so till the trees can shade the ground and preserve its moisture.

The small Chestnut group of which I boasted in the spring has made very little progress, and hardly looks larger than it did last summer. Insects injured the early growth, and there was no later growth for lack of rain. But the trees are alive and healthy, so that we have something to be thankful for. Our one Mulberry-tree bore fruit plentifully, but failed to make much leaf-way. None of these trees were either top-dressed or watered, or they would have done better. It is impossible for us to keep everything in high condition, so that we must content ourselves with the slow progress that nature affords when unassisted. It really seems as if sunshine and water are the prime essentials, and that feeding is not half so important as drinking. With this view, it is hard to understand why it would have upset the economy of nature to have a shower every night in summer, to refresh the fields and gardens of the world. Possibly in time, when the new system of producing rain has been brought down to a fine point, there will be twice a week in villages a pyrotechnic display, accompanied with explosions, that will transform the year into a perpetual Fourth of July.

Seriously speaking, should this new enterprise prove successful, what a revolution man is to produce in nature! To trust such powers to his pigmy hand is dangerous, for the consequences of his personal gratification may be fatal to millions. Fertilize the Desert of Sahara, and you cool off the south of Europe. Alter the temperature of Spain and Italy and southern France, and what is to become of the British Isles? It may be that thus the future of the Dark Continent is to be fulfilled. Migrations southward may begin. Norway and Sweden, like Greenland, may be left principally to the inferior races, while new colonies spring up in lands now tenanted but by the wandering Bedouin or the swarthy Soudanese.

Given new conditions, results are incalculable, and if the rain, as well as the lightning, is to be harnessed to the Chariot of Man, who can tell what disaster shall await the Phaeton who dares to drive such mighty and resistless steeds? Shall he too be hurled to ruin as a punishment for his over-topping ambition; or will he prove master and lord even of the elemental forces from whence he came? What is most sure is, that before they yield themselves wholly to his bidding he must suffer the consequences of his rashness, and win his way to control only by ghastly sacrifice of human life.

Hingham, Mass. *M. C. Robbins.*

## Forest-vegetation of the Upper Mississippi.—I.

THE Mississippi River and its tributaries, from Trempealeau, Wisconsin, to Dubuque, Iowa, are enclosed by bluffs varying from 200 feet to 600 feet high. At Dubuque they are much lower than at La Crosse; in the latter place they are something more than 500 feet above the level of Lake Michigan; sometimes they present steep, sandy rocks; in other places they are covered with a dense growth of trees. The region is well watered by numerous small streams emptying into the Mississippi, while it contains a number of streams of good size, as the Wisconsin, Black, La Crosse, Root and Turkey rivers. The smaller as well as the larger streams are well timbered with Oaks, Poplars, Birches, Maples, Hickories, Butternut, Walnut, Plums, Cherries, a few conifers, and, southward, the Coffee-tree and Honey Locust.

Much has been written concerning soils and the character of the vegetation. It is, indeed, a puzzling question, and I doubt whether it can truly be said that certain species strictly confine themselves to certain definite soils, yet certain trees, as well as herbaceous plants, may preponderate in certain soils. Perhaps this may be due to the physical condition of the soil rather than its chemical constitution. The Soft Maple (*Acer saccharinum*) and Black Birch (*Betula lenta*) are the predominating trees in the Mississippi, Wisconsin and Black River bottoms. They also follow up the smaller streams which flow into these rivers, but as soon as these streams are left these trees become rare. The Soft Maple and Black Birch occur most numerously where the lands are subject to overflows every year. Most of the Oaks never occur in such situations, yet the Swamp White Oak (*Quercus bicolor*) is an exception. The only place where this species occurs is in the low sandy and black bottom-lands of the Mississippi and Black rivers. The White Pine only occurs on the sandy rocks or sandy loam soil of the region, always near streams, but in the northern part of La Crosse County it is encroaching on the loamy soil. The Tamarack (*Larix larcinse*) only occurs in cold wet swamps.

The soils of the region may be classed under sandy, loamy, calcareous, alluvial and peaty. The greatest areas of sandy soil occur near the mouths of the rivers. (This is not true for the interior of the state.) These sand prairies are not, however, numerous on the west side of the river. As an illustration, at La Crosse, Wisconsin, there is a sand prairie some eight miles long, and from one-half to three miles wide. The only arboreal vegetation growing on these soils are two species of Oak, Burr Oak (*Quercus macrocarpa*), Black Oak (*Q. tinctoria*), and occasionally the Green Ash (*Fraxinus viridis*) and Black Birch (*Betula lenta*). These trees, however, only occur in close proximity to the Mississippi bottoms. Other sand prairies, similar to this one, occur at Trempealeau and Prairie du Chien, Wisconsin. As regards the herbaceous vegetation on these prairies, it might be said that it is a typical prairie flora. *Liatris cylindrica, Verbena stricta, Baptisia leucantha, Petalostemon violaceus, Œnothera rhombipetala, Bouteloua hirsuta,*

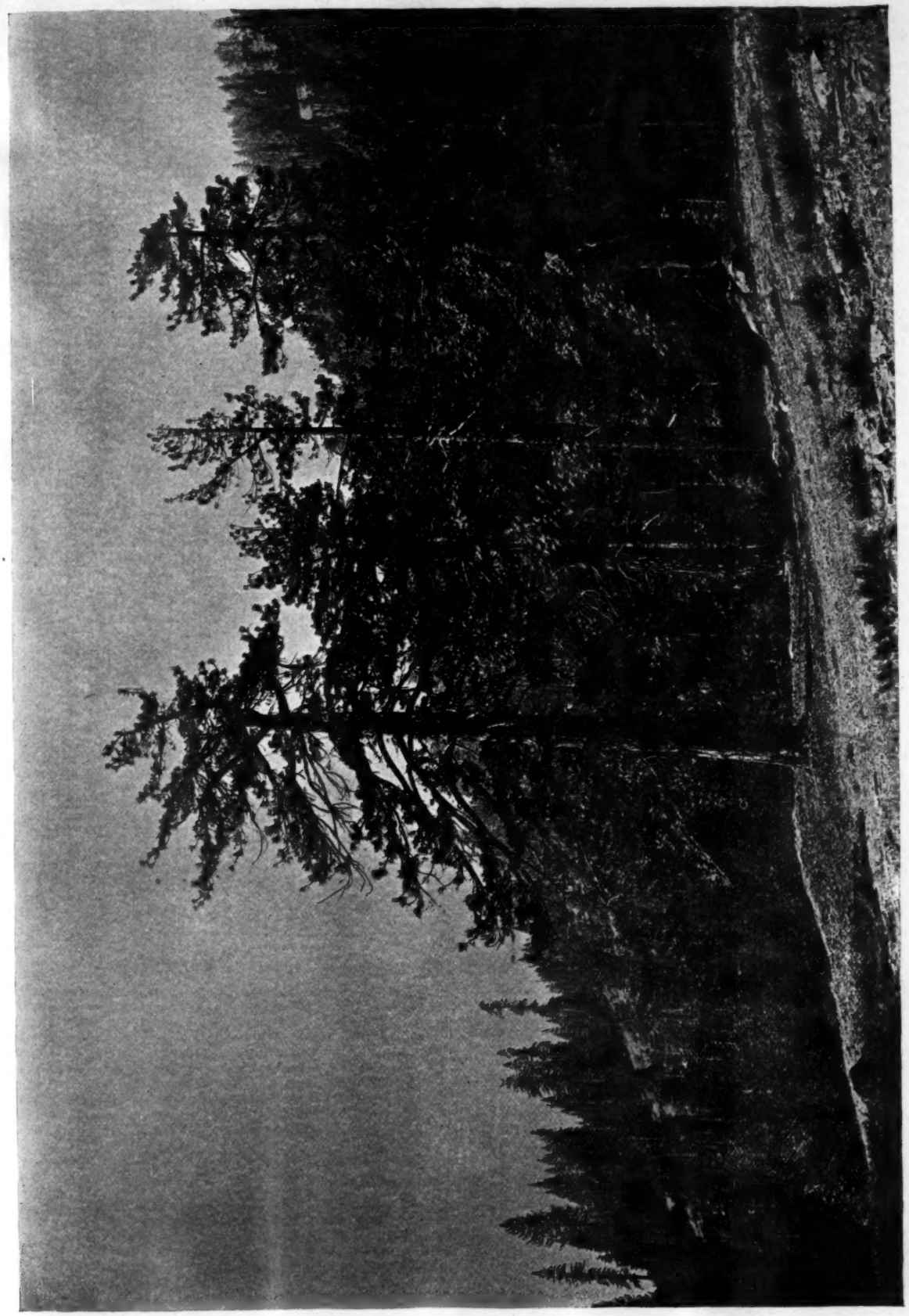

Fig. 73.—Jeffrey's Pine (*Pinus Jeffreyi*) on the Mountain above the Yosemite Valley.—See page 457

*B. racemosa*, etc., occur very frequently, though the Sand Bur (*Cenchrus tribuloides*) is the most characteristic plant where the soil has been plowed, or loosened by the winds.

The calcareous soils occupy the tops of the hills, and are of smaller extent, near La Crosse, Wisconsin, than Dubuque, Iowa. Birches, especially the Canoe Birch (*Betula papyrifera*), are a most marked feature of it, but this species is by no means confined to soils of this character. Two other plants only occur, so far as I have observed in this region, on the calcareous soils; they are, *Zygadenus elegans* and *Camptosorus rhizophyllus*.

Loamy soils are by far the most abundant; they occur on the slightly rolling ridges and in the valleys. The White Oak (*Quercus alba*) grows excellently in such soil. Alluvial soil does not occupy great areas, except at the mouths of some rivers. The great bottoms of the Mississippi consist mostly of a sandy soil, covered over in some places with a black, rich soil. The White Elm, Box Elder and Soft Maple are common.

The peaty soils are impassable during early spring and summer. Few trees are able to grow—only an occasional Willow or a Tamarack. The bulk of the vegetation consists of species of Carex and Scirpus. Now and then *Lilium Canadense*, *Cypripedium spectabile*, or, here and there, patches of *Drosera rotundifolia* and *Pogonia ophioglossoides*, where the soil is very peaty and wet, appear.

During the past thirty years some important changes have taken place in the growth of timber along the river. The pioneer settler found little timber on the hills, except those with a northern slope. The timber standing on the sunny sides was usually of poor quality, owing to numerous fires. Now these lands are mostly fenced, and fires are kept out, at least by the more enterprising farmers. The bleak hills are being rapidly covered with a forest-growth.

It is not an uncommon thing to observe patches of Hazel (*Corylus Americana*) beyond the outskirts of the timber; here, in course of a few years, will be found Oaks, Birches, Hickories and Poplars. The humus formed where Hazel grows is extremely rich and fertile, and I doubt whether trees could cover our treeless hills very fast without its help

Agricultural College, Ames, Iowa. *L. H. Pammel.*

## Recent Plant Portraits.

The following plants are figured in the September number of the *Botanical Magazine:*

*Heritiera macrophylla* (t. 7192), a large timber-tree of the East Indies, which has long been known in cultivation as the Looking-glass Plant, and forms a conspicuous feature in the Palm-house at Kew with its handsome leaves, bright green above, and opaquely silvery beneath, like the silvering on the back of a mirror. It is a large evergreen tree, a native of the forests of Bengal, Silhet, etc. In India it does not, like *H. littoralis*, with which this plant appears to have been usually confounded, affect the sea-coast or tidal swamps; and it differs from the littoral species in the much larger size of more acuminate leaves, which are also longer-petioled, and in the fruit, which is nearly globose, and furnished with an abrupt flattened beak.

*Tulipa Sintenesii* (t. 7193); this pretty dwarf species, which belongs to the Gesneriana group and is closely related to *T. undulatifolia* and to *T. Eichleri*, was discovered by Sintenes while traveling in Turkish Armenia to collect bulbs for Max Leichtlin, by whom it has been successfully cultivated and distributed. The flower is two inches long, with nearly uniform, oblong, acute segments, which are dull pale glaucous red outside, bright scarlet inside, with a large black blotch on the claw with an obscure yellow border.

*Citrus Aurantium*, var. *Bergamia* (t. 7194); this is the so-called Bergamot, or Bergamotte Orange, which is believed to be of a distinct race or variety of the common Orange, although probably better distinguished by its properties than by botanical characters, which are more or less variable. The Bergamot resembles the Lemon in its large light-colored fruit, in the elongated cells of the flesh and in its acidity. The tree, however, is less spiny, the young shoots are green, the petioles are only slightly winged, and the smaller flowers are hermaphrodite, pure white, and fragrant with a peculiar subaromatic odor. "It is one of the three principal races of the Orange proper as distinguished from the Lemons and Limes, the others being the sweet Orange, which is found truly wild in hot valleys of the eastern Himalaya and the Deccan Peninsula; the Bigaradia (bitter or Seville Orange), which, like the sweet Orange, has larger convex surface-glands of the fruit, those of the Bergamot being convex or depressed. There is no record or tradition of the origin of either the Bergamot or Bigaradia, though they may probably have been differentiated in Persia, where the passion for scents being universal, that of a variety or shoot of the Orange differing so greatly in strength and quality of odor as the Bergamot does from its allies, would be sure to attract attention and lead to the propagation of the race. It has been assumed by Gallesio to be a hybrid between the sweet Orange and Lemon, but there are no definite grounds for the assumption."

We learn from Flückiger and Hanbury that the Bergamot Orange appeared in Europe toward the end of the seventeenth century, and that its essential oil was included in a list of the stores of a Giessen apothecary in 1688. The first precise notice of it is contained in *Le Parfumeur François*, printed at Lyons in 1693, where it is stated that the oil is obtained from the juice of a Lemon-tree grafted on the stem of a Bergamot Pear.

Oil or essence of Bergamot is the product for which the Bergamot Orange is cultivated. It is used in perfumery and confectionery, and is extracted by distillation or by sponging the surface of the fruit, or by means of a machine which crushes the skin and thus forces the oil from the glands. The fruit is gathered when still green, in November and December, and from two and a half to three ounces of oil are said to be obtained from a hundred fruits.

The Bergamot is principally cultivated in Calabria, and the manufacture of the oil is chiefly carried on there, and also in Sicily and on the Riviera. The name Bergamot, it appears, is derived from the Italian Bergamotta, a pear; the Bergamotte Pear itself is from the town of Bergamo.

*Impatiens mirabilis* (t. 7195). "It would be difficult to conceive," Sir Joseph Hooker remarks, "a wider departure from the habit of its genus than this remarkable plant presents. It is an undoubted Impatiens, but, whereas the other species of that large genus are weak, succulent annuals, or low-branched perennials, *I. mirabilis* possesses an erect naked trunk that attains, in its native country, to four feet in height and the thickness of a man's leg, crowned with a tuft of many large, long-petioled, fleshy, spreading leaves, nearly a foot long, from the axils of which spring erect racemes of golden flowers, larger by far than in most other members of the genus known to me, but singularly uncouth in form." *I. mirabilis* is a native of the Island of Langkawi, off the coast of Sumatra, where it was discovered by Mr. C. Curtis, the superintendent of Penang Botanic Garden, by whom it was sent to the nursery of James Veitch & Sons, at Chelsea, where it is in successful cultivation.

*Phalænopsis Esmeralda* (t. 7196), a now well-known plant in most of the large collections of Orchids, and a native of Cochin China, whence it was introduced into cultivation in 1874. *P. Esmeralda* differs from all the other known species of the genus in its erect, many-flowered racemes, and in the structure of the lip, which is not clawed, and bears no cirrhi, either at the apex or on the disk, but two narrow auricles on the prominent claw, one on each side. The plants described by Reichenbach as *P. antennifera*, *P. Regnieriana* and *P. Buissoniana* are now believed to belong to this species, although they vary a good deal in the size and in the coloring of their flowers.

## Cultural Department.

### Plums and Plum-trees.

THE Plum crop has been unprecedented in size and quality. The curculio was not as abundant as usual, and I believe that even those who wholly neglected to fight against this pest have had a full crop. This is certainly true of the Lombard and the Damsons. I took special precautions in the way of shaking my trees twice a day, as the plums began to form, and have had an astonishing harvest. The trees would all have broken down but for a system of tying the limbs to poles which were tied at the other end to the tree or to a fence, or rested on the ground. We used all devices to aid the trees, and succeeded in saving them.

I have seventeen varieties in bearing: Magnum Bonum, or Duane's Purple, ripening early in August and continuing to the middle of September. These, in crates, sold so as to bring about three dollars a bushel. They are excellent plums, in size, color and quality, and the texture is good for canning. Their season is late, and they are only good for the table when fully ripe. The Magnum Bonum, after beginning to ripen, if in shaded places, is likely to rot, and one rotting will infect others. Plant them in uplands and enrich the soil. My trees were loaded with superb fruit. Green Gage; this is

the richest and sweetest of plums, and when well ripened on open sunny trees is very beautiful, a ball of gold with crimson cheeks. It is unexcelled for sweetmeats and rich preserves. It melts down too easily to be a handsome fruit in cans. Washington is a handsome, large, sweet plum, oval in shape, ripening just after the Green Gage. It is moderate in flavor, a great bearer, but not a specially good plum for any purpose. It melts down as soon as it is ripe and becomes useless. On the whole it might as well be discarded. Yellow Gage, as I have it, is, in shape and size, a duplicate of Washington, but ripens ten days later. It is of moderate quality and excellent texture for canning and shipping. The color is good, and for table use it is excellent when fully ripe. Lombard, or Bleeker, is ripe with Yellow Gage, that is, from the first of September to the fifteenth. It is large and fine-looking, a reddish purple. No plum is so popular. It is sufficiently solid, and is midway between the tart and the sweet sorts. The tree multiplies rapidly by suckers, and is easily obtained and generally planted. This variety brings less in market than some others because it is so abundant. Robinson is a handsome, small, native plum, yellow-marbled red. It is of about the same value as other native plums. I do not yet find any that equal in quality the best that are of European origin. Wild Goose never bears at all with me. Abundance, a renamed Japan sort (the Botan), is a fine plum and very prolific. Coe's Golden Drop ripens in September, from the first to the twentieth. This is not a firm plum, and it is too small. A tree full will not measure a bushel. Clingstone Damson is an excellent fruit for cooking and preserving. It is round, of medium size and high flavor. It is fit to pick by September twentieth, but is better if left on the trees until October. Shropshire Damson I see no reason for preferring to the preceding, although many do prefer it. It resists the attack of curculios quite successfully and bears solid masses of fruit. The noblest plum of all for home use, and one of the best for market and all purposes, is Bavay's Green Gage. This remarkable plum is an improved Green Gage. It ripens the last of September, is exceedingly rich, and, unlike the Green Gage, is firm. It is very large, averaging with the largest Bleekers. It should become a universal family fruit. It is handsome, and the tree bears well. *Prunus Simoni* is an interesting plum that looks like an apricot and grows on a tree so upright as to suggest a Lombardy Poplar. *Prunus Pissardi*, the puple-leaved Plum, bears fruit of fine texture, the deepest purple-color and very early, ripening the middle of August, and is one of the handsomest.

For home use, I should select Magnum Bonum (or Duane), Bleeker (or Lombard), Green Gage, Simoni, Bavay and Damson. For market it is desirable to have a long season of ripening, beginning with Magnum Bonum and ending with Bavay and Damsons. The custom of sending plums to market in crates, like those used for berries, is now spreading. Packing, heating and rotting are thus avoided, and the fruit is in fine condition for retailing. The profits to the grower are one-third greater, and pay him for all extra care. The plum is a tender fruit, decaying quickly, and must be handled with care.

I have never sprayed my Plum-trees, being deterred by the experience of my friends, who have spoiled the foliage with a solution of one pound of London purple to two hundred gallons of water. This solution I have found admirable for Apple-trees. For Plums I follow the well-tested plan of jarring on sheets twice a day for three weeks. Two boys carry the sheet, which is a large spread of cotton cloth tacked to light poles on the sides, and on one end slit up to the middle, so that the tree stands in the middle of the cloth. A man butts the tree sharply with a rammer padded on the end, to avoid bruising the bark. The curculios fall, and are quickly gathered and destroyed. This is absolutely a remedy, if you begin as the petals fall and continue for between two and three weeks.

Plum-knot is never a necessary nuisance, although it will appear to some extent each year. The knot should be cut off with a sharp knife, always cutting an inch below and above each excrescence. If this were universally done the disease would soon be quite exterminated. The worms inside the soft warty swellings must not be taken as the cause of the knot, but as a coincidence. It is a fungal growth. There are trees wholly given over to the pest, and it spreads to healthy trees. Some varieties are much more subject to attack than others. Worst of all is the English Hesse Plum. This I still grow, but the battle is so constant that I retain but few trees. The cutting should be done twice a year, to be sure it is thoroughly done—once after picking the crop, and again in November, after the leaves fall.

The plum is so very hardy and so useful for canning and for preserving, that it should receive more general planting and more intelligent care. If the two enemies mentioned are attended to, the crop is assured. I have had no difficulty in marketing over fifty bushels at very remunerative prices. The chief point is nice handling and putting into market when exactly ripe, not green, and not over-ripe. Among those I have not named, McLaughlin, Pond, Bradshaw, Peters' Yellow Gage and Spaulding are all fine, as grown by my neighbors.

The Plum-tree is, at best, not long-lived, and new trees should be planted continuously. These can, in some instances, be multiplied rapidly from suckers, as is the case with Bleeker, Green Gage and Damson, if you leave these on their own roots as I have. A Plum-tree exhausts itself by bearing, or is out of health and beauty, in five years. I find that the crop is increased by growing trees quite close together, but the quality is always better on trees grown openly in sunny spots.

Clinton, N. Y. *E. P. Powell.*

## The Planting of Hardy Bulbs.

OUR public parks and gardens have shown us for years the possibilities of floral decoration with plants of a bulbous nature. The great majority of these are spring-flowering, and, in consequence, die down early in the summer, and need replacing with other suitable plants. I would like to offer a few remarks upon the culture of bulbs which are really desirable, and, at the same time, hardy in the eastern states.

The best soil for bulb culture is that of a sandy nature, but a stiff clay soil may be used with good success provided a liberal quantity of sharp sand or grit is mixed with it and also placed immediately under the bulbs. I was shown recently some soil taken from one of the bulb farms in Holland, and it was composed almost entirely of white sand enriched by large applications of thoroughly decomposed cow manure, the remains of which, on shaking the bottle, were easily seen on the surface of the heavier sand. It is evident from this example that there cannot be a soil too sandy to grow bulbs successfully, if it is well fertilized and sufficient moisture is assured, until June at least. If the soil is heavy, plenty of sand must be added. Naturally moist soils, with no means of draining, would offer the worst condition for bulb culture, assuming that the bulbs are to be planted, not for one season only, but permanently. I am satisfied that this can be done with the majority of bulbs, with the exception of Hyacinths; but, although these bulbs are perfectly hardy, and will flower for several years, the bloom of the first season will never be equaled.

Of strictly hardy bulbs there is no genus that will give so much real pleasure as the Narcissus, of which much has been already said in the columns of GARDEN AND FOREST. The long lists that bulb-dealers are offering to their patrons, and the number of communications received concerning Narcissus culture, indicate the growing popularity of this flower. In a list recently received from an American dealer the genus is subdivided into the different sections, as in the lists of the large European dealers who make a specialty of the Narcissus. Our experiments with Narcissus, begun last fall, were distinctly successful, as was the large bed of Asters planted between the rows this summer. We shall now give the bed a moderate top-dressing, and shall expect double the quantity of flowers next spring. There has been just one incident to mar the entire success of the plan. A zealous but unintelligent assistant, after removing the Asters from the bed, proceeded to pull up the labels he found there, which, of course, belonged to the Narcissus.

We intend to double our planting this fall. The bulbs were ordered early in July, and August delivery insisted upon, but they have not yet arrived. Directly after they reach us they will be planted in rows six to eight inches deep, and six to eight inches apart in the rows, according to the variety, the rows themselves eighteen inches apart. This allows of hoeing and keeping the beds clean until the annuals are planted between them in summer, when the weeds must be pulled by hand. Writers have differed as to the depth at which Narcissus should be planted, and have doubted the advisability of growing other plants over them in summer. It is only necessary to add that our soil is light, with a gravelly subsoil, and our success has always been certain with deep planting in soils of this nature. I do not anticipate any harm to the bulbs from the planting over them, as their roots are dormant when the other plants are growing, and, in a wild state, they always grow in pastures where they have a perennial covering of herbage above and around them. I have an idea that premature ripening of the foliage, which often occurs here during a hot and dry season, is considerably lessened by the partial shade afforded, both to the soil and foliage of Narcissus, by the summer occupants of the beds. Narcissus are equally good for massing in beds, as is done with Tulips; but for this purpose the commoner kinds should

be used, and these should be planted about six to eight inches apart each way. These need not necessarily be removed in summer, as there will be ample space between them for the insertion of Coleus, Vinca, Geranium, and other bedding plants.

South Lancaster, Mass. *E. O. Orpet.*

## The Newer Phloxes.

THE garden Phloxes have lately taken a fresh start in the way of improvement. Many of the newer sorts have individual flowers which are enormous as compared with the best of the older ones, as, for example, Juliet Round and Cross of Honor. Eclaireur has a very dark carmine flower, immensely large and of a rich shade. The plant is dwarf, and the truss as fine as the flower. Bounetain is of a rich rose-color, paler at the centre, and having a ring of a brighter tint midway between the centre and circumference of the corolla. But of all my collection Liberté is most novel, and perhaps most beautiful. The clusters are large, but not the largest, while the flowers are of a deep salmon, with an intense carmine centre. Gold-leaf is notable mainly for its bright yellowish leaves. But we have little reason for indulging in abnormal colors in foliage or encouraging their propagation. Snowflake has large panicles of pure white flowers of the first quality. But of all the whites I have found none to surpass Croix du Sud. The flowers are porcelain-white, with a touch of carmine at the centre, and the plant is decidedly a dwarf. Aurore Boréale has a deep purple centre, surrounded by a shade of orange, and is very effective. General Breart has attractive flowers, which are white, touched with violet and a distinct violet centre. The Nearry has a deep rose-colored flower of the finest form and texture, while the centre is a rich carmine. Richard Wallace is better known. It is a fine flower, white, with rosy eye. Paul Bert, a bluish lilac, with violet centre, is a grand flower. Panama is a noble white, and of the best possible form. Diplomate is a soft rosy carmine, and very satisfactory. Deliverance approaches as near to scarlet at the centre as can be found in any Phlox, while the body of the flower is lilac. Regulus is a dwarf plant, giving fine panicles of salmon, with dark centre of violet shade.

The Phlox is one of our most reliable flowering plants, and is capable, evidently, of still further improvement. Its propagation and cultivation are so very easy as to make it the universal home flower. Its chief drawback is a tendency to multiply shoots and flowers at the expense of size and quality. The plants should be divided every second year. My plan has been to transplant them to a new bed, cutting them away until the root is reduced to a capacity of about three stalks. In the old bed I allow a few roots to send up shoots, which blossom much later. In this way my Phlox season is prolonged until November. Root cuttings make fine plants.

The Phlox requires soil that is strong, but not too highly manured. It must also be mulched thoroughly during the dry season, or the flowers will be unsatisfactory. No other plant on our lawns is so easily affected by drought or by dry weather. I mulch with fine cut grass, or with well-rotted manure, which is mainly sawdust run through the stables for bedding. Next to my Roses, Lilies and Gladioli I place the Phloxes. It is not a good flower for culling, as it has a habit, in vases of water, of dropping very quickly. It is, however, beautiful, fragrant, refined and very floriferous.

Clinton, N. Y. *E. P. Powell.*

## Protecting Plants in Mild Climates.

PASSING along one of the streets of Raleigh recently I was attracted by a massive bush, almost a tree, of *Erythrina crista galli*, loaded with great spikes of its gorgeous flowers. It was standing in a smoothly shaven lawn, and looked like one of the oldest inhabitants. As I have kept up my old habit here of lifting Erythrinas and keeping them in a cellar, I was curious to know if this great plant was lifted. On inquiry of the owner I was assured that it had occupied its present place for many years. "We saw it off a foot or more above the ground each fall, after frost has cut the top, and make a mound of saw-dust over it, and it has greatly increased in beauty since we quit lifting it years ago." I am inclined to think that a mound of earth, sodded over, would be an improvement on the saw-dust, and shall try it this winter.

This mounding with earth is a very effective protection for half-hardy plants, particularly if a cover is put over the earth-mound to keep it dry. Amateur gardeners in mild climates frequently lose half-hardy plants that they could save with a very little effort. The Lantana and *Aloysia citriodora* can both be wintered over here by the same treatment our friend gives his Erythrina. A Lantana, trained to a single stem, and pot-grown for a year until the stem gets somewhat woody, will do better for treatment than a young plant set out in spring. Cannas are commonly wintered here where they grow by cutting down the tops and laying them over the bed, but they ought to be lifted each alternate spring, and reset as growth begins, otherwise the rhizomes get so tangled up that growth is impeded. *Canna flaccida* gets to be quite a weed without any protection, and its rhizomes creep under the fences and invade neighboring grounds. It is hard to make our people understand that these tuberous roots ought to be lifted, divided and reset in spring. The fact that they live over without attention in great masses and grow vigorously is accepted as evidence of hardiness, but the scarcity of flower-spikes on these masses shows plainly that the cold has destroyed the flower-germs already formed in autumn. The earthen mound might insure the safety of the flowers, but there is no doubt that the lifting and curing of the bulbs, as practiced at the north and by commercial growers here, is the best plan, even for this section.

For plants with evergreen leaves, like the *Gardenia florida* and the Camellia, we find that the best protection is one that will allow a circulation of air, and at the same time give shade from the early morning sun. Therefore, we stick branches of Pine and Cedar thickly around them, but do not tie them up at all. In the flat, low country of eastern North Carolina these need no protection at all. This same protection with evergreen boughs will always insure the safety of the Fig here. The past two winters have been so mild that there is danger our growers will have so much confidence in the safety of their Figs as to neglect even this protection, and a sudden cold snap may injure the plants, or, at least, destroy the early crop. The cover of evergreen boughs can do no harm even in a mild winter, and will always insure a crop. When the southern people learn the full value of a light protection here our gardens will take on new beauty and productiveness.

Raleigh, N. C. *W. F. Massey.*

**Centranthus ruber.**—Red Valerian is one of the hardy plants the seeds of which are a regular stock article of the seedsmen, and are offered with much praise and with no qualification. The descriptions are correct, as far as they go, for the plants are neat, strong-growing trailers, covered in the spring with large rosettes of pink flowers. They are not such flowers as one would care to gather for bouquets, but for a wild place, trailing over stones, the plants would be desirable were it not for the unmistakable polecat-like odor emitted by the stems. The smell of this plant is so curious and interesting that I have continued to grow it, though I should scarcely recommend it for general culture, in the endeavor to locate the source of the scent, which seems to hover over the plant instead of being strongly localized in its parts. There seems not only an opening for a chart of colors, but for a scale of scents in describing flowers, since the favorite description of "fragrant" and "very fragrant" fails to convey a lucid idea to the intending grower. No one, for instance, in describing perennial Phlox thinks it necessary to mention the fragrance as that of burnt sugar, which is homely, but exactly describes the odor. Many plants, such as night-blooming Ipomœas and Nicotiana, are found to have the fragrance of the common Datura, a fact which somehow escapes the notice of the trade-writer. However, we are a nation of advertisers, and are accustomed to making the most of our own wares, so that if our friends, the commercial growers, characterize a flower which looks like Canton-flannel as "ostrich-plumes," the proper attitude is not one of irritation, but amused attention.

**Nicotiana affinis** does not seem to me to be an improvement on *N. acutifolia*, which for some years came regularly in my garden from self-sown seeds. *N. affinis* has larger flowers, and fragrance which is rather Datura-like, but it only expands its flowers late in the afternoon, and during the rest of the day the plants are unattractive. *N. acutifolia* only closes its flowers as they fade, and in this respect is a superior plant in the border. They are such easily grown and effective annuals that they are both desirable where space can be spared, the large leaves requiring considerable room in which to develop properly in true character.

Elizabeth, N. J. *G.*

**Cereus triangularis,** now in bloom in the Palm-house, was introduced in 1690 from Mexico. The specimen must have been in the garden for a great many years, as shown by its dimension and appearance. It covers the entire roof of the north end of the Palm-house, and I should say it will

weigh from 400 to 500 pounds. This enormous plant had no less than fifty flowers open in one night, and for several nights there were from twenty to thirty flowers open. Unfortunately for visitors the flowers of this and several other of the largest and handsomest Cacti do not open before dusk, and they close again soon after sunrise the next morning.

The flowers, when fully unfolded, measured thirteen inches across the sepals and six inches across the cup formed by the white petals. Lining the insjde of the flower are numerous long hair-like stamens, which are bright yellow in color. The fleshy cylindrical style reaches just over the top of the cup formed by the petals, and is divided at its apex into a number of spreading filaments about an inch long. It is impossible to give a description of these flowers that would convey anything like a full idea of their beauty.

The cultivation of the large night-blooming Cacti is not difficult, and I would recommend them for covering bare rafters and walls in large conservatories. In addition to *C. triangularis* there are *C. Macdonaldiæ*, one of the best of the night-blooming species; *C. grandiflorus*, *C. Lemaire*, *C. nycticaulis* and *C. Napoleonis*. All these grow freely, and produce large and handsome flowers which open at night.

Botanic Garden, Cambridge, Mass. *R. Cameron.*

**Symplocos cratægoides.**—This Japanese shrub, which has found a place in a few American gardens in late years, under the name of *Symplocos paniculata*, is surprisingly beautiful just now. Its branches are loaded with fruit of a bright ultramarine blue, quite different in color from the fruit of any other hardy tree or shrub. The merits of this plant have already been set forth more than once in these columns, but it is unusual to find a hardy shrub, perfectly easy to cultivate, of good habit and productive of handsome flowers and beautiful fruit, and it is always a pleasure to recommend it. Those who have gardens cannot go amiss in adding this to their collections, however choice they may be, or however small the space they can devote to the cultivation of hardy shrubs. Mr. Thomas Hogg has placed us, in America, under deep obligation for several useful and beautiful plants which he was able to send home from Japan at a time when Japanese plants, with a few exceptions, were almost unknown in America and Europe. Among them none has greater value, or possesses more conspicuous and individual beauty than the subject of this note.

Boston, Mass. *S.*

## Correspondence.

### The Beaver and the Flow of Streams.

To the Editor of GARDEN AND FOREST:

Sir,—The most practical methods of retarding the flow of water in the smaller streams, to prevent destructive floods and maintain constant water-supply, is now a pressing question, and a question well worthy of study. Dams on rivers and on their larger tributaries—except at the outlet of lakes—are not to be thought of seriously, for the elements of expense and danger are too great for any extended practical use. The work that has been done in Europe, such as the building of retaining walls, to prevent erosion on the convex side of bends, and the construction of dams, forming basins to hold back the water and catch boulders, gravel and sand, may prove the best devices in a steep, hilly country, with valuable property immediately threatened below; but no two cases will be found precisely alike, and the individual judgment in dealing with such questions will always have ample opportunity for the exercise of practical invention.

Any attempt to give details that will apply to each case will be idle, for such work should always be in charge of men who can invent new plans for the needs of each case. A few suggestions may, however, be in order as indicating the importance of turning to use the forces of nature, when, as so often is the case, these forces, wisely guided, may be utilized to do the work.

A beautiful illustration of such management is found in the fascine dams for retarding water and debris in the rivulets at the remoter sources of streams in Europe. These dams are made by digging a shallow trench across the water-course and bedding in this trench immense bundles of live willow-rods. These bundles are then banked on the upper side, and at once the Willows begin to grow, and a living dam is formed of material that is both effective and self-perpetuating.

To one who has traveled in the primitive woods of North America, these fascine dams at once suggest the work of the beaver, whose dams of willow-fagots and mud, up to four and even five feet high, and sometimes over half a mile long, have formed or increased lakelets, from which the water has filtered in a manner best adapted to the preservation of constant water-flow.

These dams, abandoned by the destruction of the beaver, are now nearly all cut through, and to a great degree rendered of no value in retarding water, yet they remain as historical indices of the past condition of our primitive forests, and no small factor to be considered in accounting for the increased inconstancy of streams which follows settlement in a wooded country. The restoration of this valuable fur-bearing model of industry to its former domain is suggested as a project deserving serious consideration. Such a restoration might be quite effective in retarding water-flow, preventing erosion and soil moisture, and maintaining water-ways, city and mill-supply, at a minimum expense; and this expense the production of valuable furs would aid materially in defraying.

Washington, D. C. *H. B. A.*

## Pomology.

### Meeting of the American Pomological Society.—I.

THE American Pomological Society held its twenty-third biennial session at Washington on the invitation of the Secretary of Agriculture. As a rule, the society accepts the hospitality of some local organization, but in this instance the gathering was welcomed by the Honorable Edwin Willets, the Assistant Secretary of Agriculture, in the Lecture Hall of the National Museum. During the sessions papers were read by several of the experts connected with the department, and all the material of the department in the way of fruit models, etc., were placed at the service of the society.

The fruit exhibit, which the older members say has not been so good of recent years as it was twenty-five years ago, was very creditable in every way. The state of Virginia, through her Commissioner of Agriculture, showed one hundred and sixty-three varieties of Apples, which represented all the fruit regions of the state, from tide-water to the mountains, and many of them, notably the Albemarle Pippins, were exceptionally good. From Mississippi, Tennessee, New Jersey and many other states there were promising seedlings, and Messrs. Ellwanger and Barry had a very large display of Pears. Of the minor exhibits there was a striking collection of Citrus fruits from Florida shown by the Rev. Lyman Phelps, with some admirable Pines from the same state by Mr. H. S. Williams. President Berckmans exhibited an interesting collection of Japanese Persimmons of all sizes, shapes and colors, and Mr. H. M. Engle, of Pennsylvania, some of the remarkable Chestnuts which he is growing.

A good deal of time was spent on the revision of the catalogue, which is really one of the most important functions of the society, but very plainly it is a difficult matter for a few members in the hurry of such an occasion to pass any such deliberate judgment as they deserve on the merits of fruits and their adaptation to different regions. Mr. Berckmans' suggestion in his address, that this work should be practically done by local societies, under the supervision of the national one, commended itself to all of the members. We give below a few of the more important paragraphs from this address, which was a general survey of the field and a careful record of pomological progress since the meeting of the society in Florida two years ago. The officers chosen for the next two years are Prosper J. Berckmans, of Augusta, Georgia, President; C. L. Watrous, of Des Moines, Iowa, First Vice-President; G. B. Brackett, Denmark, Iowa, Secretary; Benjamin G. Smith, Cambridge, Massachusetts, Treasurer.

#### THE PRESIDENT'S ADDRESS.

In speaking of the work of auxiliary societies, Mr. Berckmans said:

These local organizations could hold meetings every month, or even oftener if need be, especially during the fruit season, and at these meetings the merits and demerits of fruits could be ascertained, annual reports made to the state society, to which these local societies should be auxiliaries. In this way the

chairmen of state fruit committees could collect more reliable reports than can be obtained where state and district societies do not exist. Our state reports are in some instances deficient in reliable and practical information. To persons unacquainted with the scope of our state reports and their influence in bringing the most desirable class of citizens to their borders, let me say, that one of the main considerations a prospective settler takes in view is the adaptability to successful fruit-growing of any section where he intends to make his residence. The state which gives the most comprehensive and reliable report as to its advantages in these productions will receive the most intelligent, energetic and desirable addition to its population; and that community most exclusively devoting itself to fruit-growing and horticultural pursuits is found to advance more rapidly in everything tending to elevate, refine and enrich its citizens.

In urging the necessity of scientific pomology, Mr. Berckmans argued as follows:

While this society has never deviated from its original object, which is the advancement of the science of pomology, yet the wonderful strides made in the production of fruits make it imperative to give commercial fruit-growing all due attention, inasmuch as the magnitude of that source of production is, in a measure, the result of the scientific work of this society. When we compare the wonderful array of the various fruits with which our markets are now supplied with those of a generation past, well may we feel amazed at the variety and abundance as well as improved quality of our market products. A few years ago many fruits were offered in such limited quantities that the names of special varieties were almost wholly ignored. Strawberries were all strawberries; the Isabella was the only name used to specify a variety of Grapes that could be found, and among Pears the Sugar Top was synonymous to the Bartlett, and every Orange, good, bad or indifferent, was sold as a Florida Orange. Now, on the contrary, the market reports issued by every commission man who values his interests name the varieties of all classes of fruits, and quotations are made according to their value. Purchasers have become gradually educated to the knowledge of the best varieties, and thus inferior sorts are driven out of the market. With these facts in view, commercial fruit-growers are interested in improving our popular varieties of fruits by the most careful methods of cultivation, picking, sorting and packing, and they can increase their pecuniary returns by promoting the advance of scientific pomology.

### THE HYBRIDIZATION OF PLANTS.

Professor Charles E. Bessey began a paper on this subject by saying that in the lowest forms of vegetable life the process of reproduction is exceedingly simple—that is, one plant divides itself into two; each new plant divides again, and so on indefinitely. But when conditions are not so favorable, reproduction takes place in a general way as follows: Two of these free-swimming aquatic plants come together and merge their substance into one another—that is, fertilization consists simply of two entire plants, or parts of plants, which fuse into one, and lose their previous identity. This means the simple union of two individuals for the sake of strength and production. The united plant is able to live and resist adverse influences, which otherwise would have destroyed the single plants. The two plants after union become one round body, and this covers itself with a protecting shell, and since the larger the mass is, the smaller, proportionally, is the exposed surface, the united plant needs less covering than the two did before the union, thereby saving both material and force. Thus the union of the two into one mass has saved the life of the individual and has perpetuated the species. This is essentially what takes place in all plants where there is anything like fertilization. The law is, that fertilization is the union of two masses of living matter.

In the fertilization of flowering plants we have the same coming together of individual masses, and as a consequence of the union of the male and female cells, there begins a growth in the young seed which results in the formation of the embryo which is to be found in every seed.

This fertilization—that is, the joining of the substance of the pollen-cell with that of the seed-cell—does not differ in any essential respect from that which takes place in the simplest plant.

The old distinction between crossing and hybridization is one which has nothing like as much importance as at first sight it would seem to have. If varieties differ from species only in degree, then crossing of varieties differs from hybridization of species also only in degree. Furthermore, it is well known that no two animals are ever exactly alike. No two plants are ever exactly alike, even where they belong to the same variety; and therefore when the pollen is taken from the flowers of one plant and carried to those of another there is a slight crossing of kinds. It is not as great as when the pollen is taken from a flower of one variety to that of another, nor by any means as great as when it is taken from the flowers of one species to those of another, but all these differ only in degree.

Whenever crossing takes place the offspring will partake of the character of both parents. This follows as a necessity from the nature of the act. We have seen that in any fertilization there is a union of two plants, or two parts of plants, and in crossing the male organ belongs to one variety or species, while the female organ belongs to another. When these two organs are joined the result is a union of the character of the two varieties or species. In this way the offspring must partake of the nature and characteristics of its parents. It is impossible for it to be otherwise. Now, it has been noticed in the breeding of animals, and to a certain extent in the breeding of plants, that the two parents do not always exert the same influence upon the offspring. In the case of many natural crosses which take place between the wild species of plants, noticeably in the Verbenas, the Oaks, the Willows and others, we have been able to detect this difference with such certainty that it is not at all a difficult thing to tell whether, in the case of any particular cross, the pollen comes from this or that species.

In nature, crossing is accomplished largely through the agency of insects, but when we bring this matter within the domain of horticulture we cannot afford to depend upon such precarious aid. The time is coming when the grower of fruits will as carefully select the parents for his crosses as the grower of fine animals now does. The grower of plants, however, has one advantage over the grower of animals. He need not pen up his plants, he need not grow them in different greenhouses or in different fields. As the pollen of our fruit-trees is always yellowish, there is no difficulty in handling it upon the black point of a hair-pencil. The pencil should be slightly moistened, so that the pollen will adhere to it, and then, when loaded with pollen from one flower, it can be gently brushed over the ends of the pistils of the next one. In order to be sure that the stamens of the flower to which the pollen is brought do not themselves drop pollen to the pistils, it is well to remove them at once by clipping them out by means of a delicate pair of scissors.

This operation is not difficult. It simply requires care in watching for the exact time of the maturity of the flower, and then a very little skill will enable one to place the pollen. The maturity of the flower may be told in the following way. The stamens are matured when they are dropping the pollen. This can be seen by any one at a glance. The pistils are matured when the top stigma has a moist appearance. This moisture is what makes the pollen adhere, so that any attempt at crossing before the maturity of the pistil would be ineffectual.

There can be no question that horticulture will be greatly benefited when horticulturists begin to breed varieties scientifically. It is a well-known fact that the seeds of apples, taken from any particular tree, will produce all sorts of variations. Now, the secret of this is, that the flowers which produce these seeds had been crossed with pollen taken by insects, perhaps, from a dozen different kinds of trees. Furthermore, all our Apple-trees are now of mixed blood, and we know very well what that means, especially in the animal kingdom. Now, careful experiments should be made by members of this society. Suppose that you select two Apple-trees which are not far from one another, and which, for convenience, are not very large. It will be best to select trees of marked varieties. If they are trees which have characters about them which would indicate that they were likely to reproduce their kind and their characters, it would be better still. Now, when these trees are just about ready to flower, cover each one with mosquito netting which has been carefully sewed together, so as not to leave any opening to admit insects. When the stamens on the one tree are just bursting open so as to shed their pollen, take a soft camel's-hair brush, wet it slightly, and carry some of the pollen from certain flowers on the first tree to certain flowers on the second tree. Then carry pollen from the second tree to certain flowers on the first tree. If you remove the stamens from the fertilized flowers it will add much to the certainty of the results. Mark the flowers which you have experimented upon; keep the trees covered with the mosquito-netting until the flowers wither, and then remove it. Carefully note the growth of the apple during the season. Notice whether the flesh of the apple has been changed in any way, and when the fruits are finally

cut up save the seeds for planting. When these seeds have grown, cions should be taken from the young seedlings and placed upon old trees, so as to bring them into bearing at the earliest possible period. It will be very interesting to compare the results of such crossing. If the parent tree possessed marked characters, we should expect to find these reproduced in a modified way in the offsprings.

Similar crosses may be effected between varieties of vines, and it is still easier to secure early returns from the experiments. Cherries, Plums, and even the ordinary small garden-fruits may be experimented upon in the same way. If the members of this society were to plan a series of experiments, each man confining himself to a single one, within the next ten years we should without doubt have some surprising results.

It is by the application of exactly these principles that the breeders of animals have been able to reach the results with which we are so well acquainted. It still seems to us in horticulture rather a theoretical thing when we talk of crossing and breeding in order to produce new and desirable species, but that which has proved of such great value in the animal kingdom will in like manner prove of value in the vegetable kingdom.

The horticulturist of the future, and of the near future, too, will be a breeder of plants, and he will be able, by judicious crossing, by intelligent working for a particular form, to control the results of his breeding.

### SUCCESS WITH SMALL FRUITS.

Mr. J. H. Hale delivered an address on this subject. As a first requisite he named a thorough preparation of the soil. Such a recommendation seemed hardly necessary, but in a great majority of cases fruit-growers fail for lack of attention to this fundamental matter. Of course, in the virgin soil of the prairies different treatment is needed from that required in thin and worn lands in the eastern states, but there is the same necessity of deep preparation and thorough drainage, although there is less necessity for fertilizing, which is the second requirement wherever the soil is not absolutely rich. For small fruits, potash and phosphoric acid are the plant-foods principally needed in Connecticut. Wood-ashes is the most effective form in which potash can be used, but in the south, where it can be obtained, the ashes from cotton-hulls is better still. Two hundred bushels of ashes to the acre is not too much, and to this a ton and a half of finely ground bone may be added to supply the phosphoric acid. Ground bone had proved the best form in which phosphates could be applied, but South Carolina rock and other forms of phosphate should be tried. As a rule, but little nitrogen is needed, since the tendency of this is to make a growth of foliage. Of course, in certain instances it is valuable, as, for example, while the Cuthbert and Golden Queen Raspberries will flourish under treatment of potash and phosphates only, the Marlborough, in the same field, would be improved by the addition of a trifle of nitrogen, because it is a feeble grower, and needs strengthening. (In other districts nitrogenous manures have proved essential to the highest success with small fruits.)

It is a great mistake to grow the plants too thickly. It generally happens that from two to three times as many Raspberries, for example, are planted to the acre as can be grown to advantage. They should not be set closer than six feet apart each way, and seven, or even eight feet apart, are better for strong growers like the Cuthbert. Then the berries will be big, bright and firm. Hedge-row culture and matted-row culture is wrong, and the hill system is right almost always. Berries grown in this way will be superior in size, texture and quality, and will yield more quarts to the acre, and, besides, the cultivation will cost less when it is done thoroughly.

Irrigation should be provided for Strawberries, where it is at all possible. The grower cannot afford to take all preliminary care for thorough preparation and painstaking cultivation up to the time the plants bloom, and even up to the time the green berries appear, and then lose all on account of the failure of rain for a few weeks. At such a time the control of a supplemental water-supply is invaluable.

After the crop is grown the marketing demands much thought and study. Fruit-growers often work too hard and think too little. It pays to study fruits as they come into the market and to mark the different styles in which they are offered. Fruit which is nicely topped, but does not run uniformly throughout the package, may sell well for a time, but in the long run that grower is always sure of a market who has his best fruit at the bottom, and who is willing to stamp his name and post-office address on each package, so that the people who buy his fruit will know whom to address when they want more of just the same sort. As an instance of success Mr. Hale cited the case of a man who was careful to select and grade every basket of his strawberries, and in the bottom of each basket he placed a card bearing his name, the name of his farm, with the date and the hour of the day in which the fruit was picked added in stencil, and after all this, in big type, was the legend, "This fruit will cost five cents more a basket than the market price."

The eye of a buyer must first be pleased, and the value of an attractive style of placing fruit on the market cannot be overstated. A strawberry grower in western Massachusetts found that it paid to put a rosebud on the top of each basket in the crate, for these decorated packages would sell when no other ones were wanted. The most certain way of securing a market for fruit is to establish a reputation. A grower must make his name have a positive value. He must persist in careful selection and uniform packing until buyers know that his berries are certainly of the first quality and can always be relied on. A name which stands for all that is best in the possibilities of fruit-culture will always sell the fruit upon which it is found.

After all, the home is the best market for American fruit-growers. The average American family uses too little fruit. Farmers, and even orchardists, rarely have enough small fruit. They say it does not pay to raise berries and they can buy all they want. Really they buy a few now and then instead of having an abundant supply every day. Half a bushel of fruit the year through can be profitably disposed of by the average family every day. Every one with half an acre of ground to devote to the purpose can have enough small fruit for home use. This does not mean a few berries in a corner of a garden, but a full line of the standard varieties of all kinds of small fruits planted in long rows, so that they can be cultivated by horse-power, yielding an assured abundance for the table, for canning, etc. Last year a Connecticut farmer kept account of the fruit which he supplied to his family from half an acre of ground. He watched the markets and charged his family with the price of all they consumed, and it amounted to $365, or more than $700 per acre. This was the actual money value of what the consumed fruit would have cost, but the account makes no mention of the pleasure and zest which the product brought to the table in that household, nor of the beauty of the garden, which was an ever-changing picture for the enjoyment of its owner and his family, nor of the advantages from the healthful out-door habits it encouraged, nor of the delights of tasting new fruits, or the hundred other subtle ways in which a garden ministers to mental and physical health.

### NEW AND PROMISING SMALL FRUITS.

The paper of Mr. J. T. Lovett on this subject covered all kinds of small fruits, but we only have space for the following:

But little of interest is to be found among new varieties of the Currant. Fay's Prolific is a success with me, and I hear none but good reports of it from any quarter. North Star gives promise of being a valuable variety, especially for the market-grower. Black Champion is an improvement upon the old Black Naples; the berries are larger and produced in greater abundance. I am told it is of better quality, but to me all the black currants are repulsive, in odor and flavor. The Crandall has some merit for culinary purposes. It is of strong growth, exempt from the attacks of insects and disease and very prolific; but the fruit is too harsh and austere to be acceptable as a dessert-fruit. The berries are exceedingly large, almost equaling in size the Delaware grape, and are decidedly attractive. The claim that a good jelly can be made from it is founded on fact, as I can bear witness.

The Industry Gooseberry has not proved as successful with me as it has in many other places. In Monroe County, New York, and upon the Hudson River, it is giving the greatest satisfaction. I also saw it fruiting in perfection in Atlantic County, New Jersey, the past season. Although the best of the foreign varieties I have yet tasted, it loses its leaves prematurely and fails to ripen its fruit.

The dwarf Juneberries have given considerable satisfaction at the east. The chief complaint has been that the plants do not yield heavily enough, and that the berries and foliage are attacked by a fungus. The variety known as Success is an improvement upon the type in point of size of fruit, quality and productiveness, and has suffered less from the attacks of fungus than the common dwarf variety. It has suffered also to a slight extent. I find the Juneberry much better for canning, pies, etc., than as a dessert-fruit. In its natural state it lacks flavor, but when cooked it is quite acceptable.

*Eleagnus longipes* is an interesting fruit. Did it ripen in late autumn instead of July its value would be greatly enhanced.

The bush is of low spreading habit, densely clothed with foliage, and it comes into bearing as quickly as a Red Currant. Its yield is simply wonderful, the berries being literally crowded upon the under side of the branches. The fruit is borne upon slender stems about an inch and a half long, of cinnabar color, with numerous small light gray dots, and about three-quarters of an inch long by half an inch in diameter. It is tender and juicy, with one large, long, shapely pointed seed in each berry, but so acid as to render it unfit for use as a dessert-fruit, but useful for tarts—in fact, for all the purposes for which the Cranberry is used.

## Notes.

The latest reports indicate that the raisin-crop of California, which has been estimated as high as 2,000,000 boxes, will fall considerably short of that figure.

It is reported that the presence of troops in the Yosemite this year has kept the sheep and shepherds away from the Reservation, and, as a result, there have been but two or three small forest-fires. Such fires are usually numerous in August and September.

It is probably an unusual thing for *Ficus elastica*, the so-called Rubber-tree, grown as a pot-plant, to produce fruit. The fact is worthy of notice, therefore, that a plant in the garden of the Honorable M. P. Kennard, in Brookline, Massachusetts, which has stood out-of-doors all summer, is now covered with its miniature figs. The same plant has produced fruit in previous years.

It is recorded of the isolated Andaman Islands, which have been scientifically observed since 1858, that, between that year and 1866, fifteen intentionally introduced plants and sixty-one "weeds of cultivation" were added to the six hundred species of indigenous origin; and that by 1890 twenty-three additional plants had been wittingly introduced and fifty-six additional ones had established themselves, while four of the foreigners noted in 1866 had disappeared.

Last week the Board of Health in this city seized some grapes because the stems were discolored by one of the copper mixtures used as a preventive of Black Rot. Of course, this caused something like a panic in the market, and the grape-growers on the Hudson, who were already receiving low prices, have suffered severely. We shall be disappointed if investigation does not show that the alarm was groundless. The Bordeaux mixture is certainly harmless when taken in such minute quantities as adhere to the skins of grapes which have been sprayed.

One of the most striking proofs of the advantage which may result to science from the earnest efforts of even "amateur," or partially instructed investigators, is supplied by the history of Leeuwenhoek. At the time of the invention of the microscope, in the seventeenth century, he was book-keeper and cashier in a clothing house at Amsterdam. Fascinated by the attractions of the new instrument, he devoted himself to its manufacture and use, and, despite the deficiencies of his education, made many important discoveries in plant anatomy, as well as in that of human beings, and was the first to point out that difference in the structure of stems upon which the first great division of flowering plants into monocotyledonous and dicoteyledonous is based.

In a book on the "Useful Plants of Australia," written by Mr. Maiden, we read that, with the exception of such as produce timber, these plants are not of extraordinary value. Almost all Australia's medicinal plants come from the northern regions, where species from the Malayan Islands and from the south of India mingle with those that are strictly indigenous. The Eucalyptus, with its 130 species, are the most valuable trees, supplying certain food-products as well as oil and timber. Next in value seem to be the Acacias, the leaves of which furnish fodder, while the bark is extensively used in tanning. The trees are being so rapidly destroyed for these two purposes that efforts are now being made for their systematic planting. Few Australian trees supply good fibres.

At the exhibition in connection with the meeting of the Pomological Society in Washington last week the superior brightness in color of northern fruits was very clearly shown. The apples from Wisconsin could be distinguished from those of the middle states as far as they could be seen, and it would hardly be a figure of speech to say that they fairly illuminated the part of the hall where they were placed. It is fair to say, however, that the season in Wisconsin has been exceptionally unfavorable to the growth of fungi, and this may partly account for the entire absence of all specks and discolorations on the fruit. But, after every allowance is made, the fact remains that apples of such perfect smoothness, clearness of color and delicacy of marking are rarely seen in our eastern orchards. It was remarked by more than one of the visitors that they never before realized how beautiful a perfect apple can be.

Hardy shrubs which are in full bloom during the first week of October are not common in our northern garden. The Sea-shore Groundsel-tree (*Baccharis halimifolia*) is just now in full bloom, and, although not very often cultivated except by the curious, is well worth a place in the shrubbery. It is a tall resinous, or glutinous, shrub, growing sometimes to the height of ten or twelve feet, with dark yellow-green, abundant foliage, and small heads of yellow or white flowers. Baccharis is a genus of *Compositæ*, and its individual flowers are minute and are gathered together in small heads without the conspicuous ray-flowers which make the inflorescence of Asters, Sunflowers and so many other plants of this family conspicuous. The heads are not large, and, individually, not very showy; but they are produced in such great profusion in leafy panicles at the end of the branches, that the plants make a good show at this season of the year. This is especially the case with the fertile one, for in Baccharis the male and female flowers are borne on distinct plants. The tufts of long pure white hairs give to the females an entirely different appearance from that of the yellow-flowered males. Plants of Baccharis grown in good garden-soil will be a surprise to many people who have only seen it in its native sea-beaches, and once seen under good condition its cultivation, no doubt, will become more general.

"We do not realize," says the *American Architect and Building News*, "how imperatively necessary a supply of wood is, or how little we have left to satisfy our increasing needs. The forest-producing area of the United States has long ago been settled as thickly as it is likely to be, and the tendency of population is now strongly toward the treeless, though fertile lands of Kansas, Texas, Nebraska, Colorado and Montana. The people who settle in those states must have houses, and must have timber to build them with, and the railroads which serve them must have perennial supplies of ties. For all these needs wood must be had, even if it is brought from the ends of the earth. We have known building timber to be sent from Boston to Zanzibar, and from New York to Buenos Ayres, and we may rest assured that when our stock is exhausted we shall have to buy more, and shall have to pay the people who have it whatever price they choose to ask for it. So far, the steps which have been taken by the public authority to check the annihilation of the forest-wealth of the country have been hardly more than the feeblest demonstrations of a consciousness of the evil against which they were directed. Something was done to encourage tree-planting by settlers, under the so-called Timber-Culture laws, which provided that a settler who cultivated trees on one-sixteenth of his homestead claim should receive his patent in three years instead of five; but this is a mere trifle, and the unwillingness of Congress to do anything of serious practical significance is curiously shown by the law adopted at the last session, in which it was declared that it is 'important to reserve all public lands bearing forests, or covered with timber or undergrowth, on which the timber is not absolutely required for the legitimate use and necessities of the residents of the state or territory in which the lands are situated.' It need hardly be pointed out that 'the legitimate use and necessities of the residents' in the neighborhood of Government timber-lands have generally required them to plunder and denude the lands to their hearts' content, and will be likely to continue to do so until some much more forcible language than this is used in the public statutes, and officers are assigned to see that the statutes are complied with; and even then, in our opinion, little will be accomplished toward restoring the balance between the production and consumption of timber until private plantations, as well as natural forests, are brought under official supervision."

## Catalogues Received.

Currie Bros., Milwaukee, Wis.; Flowering Bulbs, Plants, etc.—Frederick W. Kelsey, 145 Broadway, New York, N. Y.; Choice Trees, Shrubs and Hardy Plants.—Samuel C. Moon, Morrisville, Bucks Co., Pa.; Circular of Exochorda grandiflora.—Schlegel & Fottler, 26 South Market Street, Boston, Mass.; Bulbs for Autumn Planting.—Dr. H. Schroeder, Bloomington, Ill.; Fruit-trees, Grape Vines, Small Fruits, Roses, etc.—Thomas S. Ware, Tottenham, London, England; Select Collection of Bulbs and Perennials for Autumn Planting. Complete Collections of Narcissus, Lilies and Irises. Autumn Catalogue of Carnations, Pæonies, Phloxes, Primroses, etc.

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